1967-04-17

Naval Postgraduate School Faculty Bulletin, 1967-04-17

Monterey, California, Naval Postgraduate School

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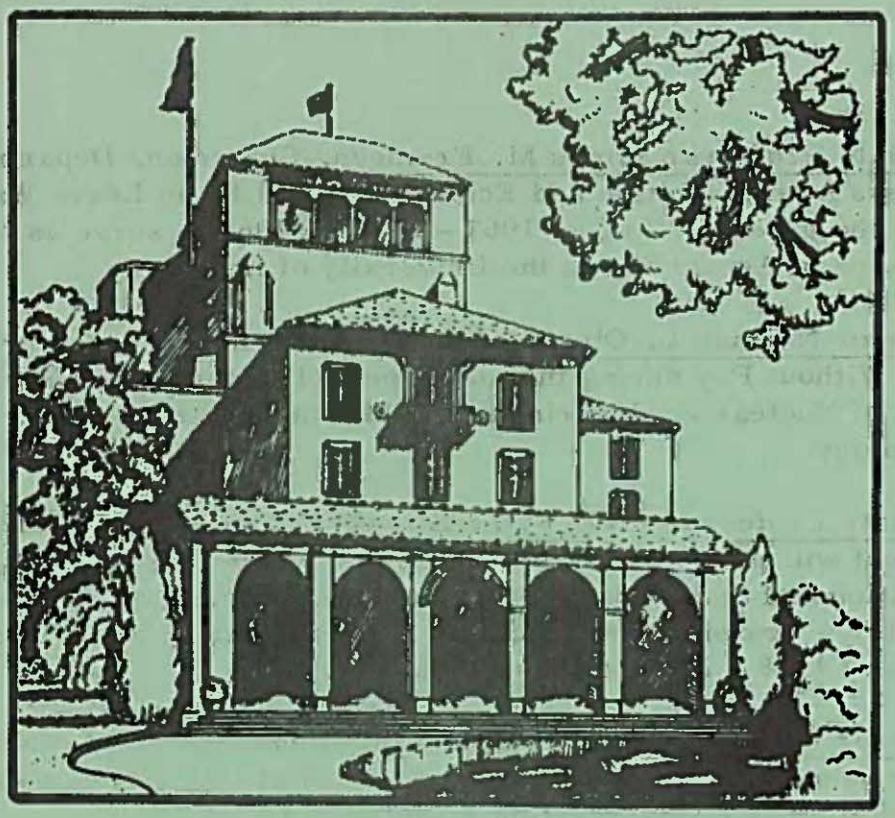

Naval Postgraduate School

FACULTY BULLETIN

17 April 1967

CHANGE IN DEPARTMENTAL CHAIRMAN

At Dr. E. C. Crittenden's request, he will relinquish his position as Chairman of the Department of Physics effective 30 June 1967 to devote his full time to teaching and research. Professor Otto Heinz has been appointed Chairman of the Department for a term of three years, effective 1 July 1967.

FACULTY LEAVES OF ABSENCES

The following leaves of absence from the Naval Postgraduate School have been approved for Academic Year 1967-1968:

Associate Professor James M. Fremgen, Chairman, Department of Business Administration and Economics, will be on Leave Without Pay during the period 30 August 1967 - 29 June 1968 to serve as Visiting Professor of Accounting at the University of Hawaii.

Professor Norman L. Oleson of the Department of Physics will be on Leave Without Pay during this same period to serve as Visiting Professor of Nuclear Engineering at the Massachusetts Institute of Technology.

Associate Professor Alvin F. Andrus of the Operations Analysis Department will pursue studies in the fields of Operations Research, Simulation and Statistics at Oregon State University under the Navy's Long Term Training and Education Program during the period 1 January 1968 - 20 September 1968.

Professor Richard W. Bell, Chairman, Department of Aeronautics, will be on assignment to the scientific staff of the ONR Branch Office at London for one year starting 1 September 1967.

PROFESSIONAL MEETINGS

The Golden Gate Chapter of the American Society of Metals and the Department of Material Science and Chemistry will hold their annual joint seminar on Saturday, 29 April at the Postgraduate School. The technical meetings will be held in Room 400 Spanagel, and a dinner meeting will follow at the Officers' Club.

SEMINAR FOR PENINSULA PUPILS AT NPGS

The Department of Aeronautics held a seminar in Astronautics and Aeronautics for Seventh and Eighth graders participating in the Peninsula Lyceum-Seminar program. The seminar was held on 8 April from 0900 to 1200 in Spanagel 421, and in Aero-Lab space in Building 234. The following members of the faculty participated:

CDR Donald Layton	"Aircraft Launch from Carriers"
Dr. Allen Fuhs	"Space Power - Consideration for Ramjet Design at Sixty Miles up"
Dr. Gerald Lindsey	"Materials for Design"
Professor Ulrich Haupt Professor George Higgins	Tour of facilities in Halligan Hall

NPGS ALUMNUS IS AUTHOR

LCDR Thomas J. McCalla is the author of a book, Introduction to Numerical Methods and FORTRAN Programming, recently published by Wiley. Mr. McCalla graduated from the NPGS in 1961 with a Master's degree with major in mathematics, writing his thesis under Professor Faulkner. In his preface he mentions that as a student at the NPGS he felt the need for a book combining numerical analysis and programming and decided to provide it. Mr. McCalla is now at the Naval Research Laboratory in Washington, D. C.

DISTINGUISHED VISITORS

Mr. John Keller, Director of Analytical Studies at the Office of the Vice President, Finance, University of California at Berkeley, presented the closing address for the first of the three NMSC one-week courses offered this spring for Flag and General officers and high ranking civilians. Prior to his present assignment Mr. Keller served as assistant to the Assistant Secretary of Defense (Comptroller), OSD, during the implementation of the Planning, Programming and Budgeting System for the Department of Defense.

Dr. J. W. T. Youngs, Chairman of the Department of Mathematics at the University of California, Santa Cruz, presented a lecture entitled "The Coloring of Graphs" on 12 April. The lecture was sponsored by the Postgraduate School Chapter of the Society of the Sigma Xi.

The Postgraduate School's Lecture Program presented the following speakers to the students and faculty. On 5 April Dr. Walter Muir Whitehill, Director and Librarian of the Boston Athenaeum, spoke on the topic, "Fleet Admiral King." Among his writings is a book written with Admiral King on his naval career. Mr. Claude Batault, Consul General of France, San Francisco, spoke on "The Role of France in the European Community" on 12 April 1967.

PRINCIPAL PROFESSIONAL ACTIVITIES

The following papers were presented by members of the Department of Physics at the meeting of the American Physical Society held in Chicago, Illinois, March 27-30.

Associate Professor Don E. Harrison, Jr.: "Inelastic Energy Losses and the Computer Simulation of Heavy Ion Ranges."

Abstract: Computer simulations of 1-20 keV Xe ion ranges in W agree with experiment when the inelastic energy loss rate is approximately 25 percent of the rate predicted by

Lindhard for high energy ions. The Firsov model gives better agreement between experimental and simulated integral penetration distributions, than the Lindhard model in the (100) orientation, but neither is satisfactory in the planar channel of the (110) orientation. The combination of simulation and the Firsov model explains the main characteristics of experimental studies of Xe ion ranges in tungsten.

Associate Professor Don E. Harrison, Jr. and LT H. M. Effron, USN: "Computer Simulation of Copper Sputtering by Argon."

Abstract: A computer simulation has been performed in which a copper micro crystallite was bombarded by 1-7 keV neutral argon atoms on the (100), (110), and (111) surface orientations. Sputtering ratios were determined and sputtering deposit patterns produced. Sputtering deposit patterns produced by this simulation appeared identical to those produced experimentally. The correlation of crystal location and deposit location of these atoms showed no evidence of momentum chain or focusing phenomena.

Professor J. R. Neighbours and A. G. Beattie and J. E. Schirber (Sandia Laboratory): "Pressure Dependence of the Superconducting Energy Gap in Tin."

Abstract: The pressure dependence of the superconducting energy gap in tin has been measured by means of the attenuation of longitudinal ultrasonic waves. Hydrostatic pressures of up to 3.5 kilobars were applied using the solid helium technique. The data were analyzed for a single energy gap using the simple BCS theory for the attenuation of longitudinal ultrasound. The results show that the change in the energy gap as a function of pressure scales with the change in the critical temperature as a function of pressure.

Assistant Professor William Reese: "Calorimetric Study of the Ferro-electric Transition in KDP."

Abstract: The results of a high resolution study of the details of the heat capacity anomaly at the ferro-electric transition in Potassium Dihydrogen Phosphate were presented. The results of the study were to show that the transition could best be understood as a second-order transition with an imposed, symmetric, logarithmic divergence. The transition entropy was shown to agree very closely with that calculated from the possible configurations of Hydrogen bonds in the material.

At the "First Annual Princeton Conference on Information Sciences and Systems" held on March 30-31, 1967, at Princeton University, the following papers were presented by members of the Department of Electrical Engineering:

Associate Professor S. G. Chan: "Topological Formulas for Digital Computations."

Abstract: A method of expanding various "free-admittance" products in the topological formulas for the determinations of network functions in passive two-parts so that a single free-finding computer program may be used.

Professor S. R. Parker and LCDR A. Ardalan, Iranian Navy: "On the Growth of Equivalent Networks with Imposed Design Constraints."

Abstract: The congruent transformation $[Y'] = [r]\,[Y]\,[r]^t$ is applied to the admittance matrix of a network to generate equivalent forms which have the same transfer impedance between any two ports. Realizability conditions with passive components are investigated and the resulting constraints upon the equivalent network and the transformation are discussed.

Professor George J. Thaler and LT A. B. Lemanski, USN: "Linear Control System Using Algebraic Methods."

Abstract: After choice of system structure, performance specifications including root locations, error coefficients, bandwith and root sensitivity are converted into simultaneous nonlinear algebraic equations in which the adjustable parameters are the variables. Simultaneous solution of these equations provides values for the parameters which satisfy all specifications.

Lieutenant Commander Kenneth L. Abernathy of the Government and Humanities Department participated in a panel discussion at Monterey Peninsula College on April 5. The topic was the effect of the recent Supreme Court decisions on police procedures for interrogating criminal suspects. Other panelists were Mr. Tor Spindler, MPC Criminologist, and Mr. Francis Heisler, Carmel attorney.

Professor W. Peyton Cunningham, Departments of Physics and Operations Analysis, has recently returned from Thailand where he presented a series of lectures on Operations Research/Systems Analysis. The lectures were originally requested of the ARPA, the Advanced Research Projects Agency, by the Staff of the Royal Thai Air War College, a new government institution established in January 1967. The class consisted of some one hundred twenty officers from the Army and Navy as well as the Air Force. The lecture series was an introductory survey of Operations Research, including case studies on the classical Operations Research of WW II, and an introduction to probability and statistics, game theory, linear programming, and systems anaylsis at the national policy level. The lectures were scheduled from eight to twelve each morning for a week and were delivered in English.

Professor A. E. Fuhs of the Department of Aeronautics attended the March 30-31 meeting of the Naval ABRES Advisory Group at Norton AFB. This was a joint meeting with the USAF Ballistic Missiles Reentry Systems Consultants Group. The two groups provide advice on the ABRES program of reentry research and development.

Professor Fuhs contributed the following paper at the 8th MHD Symposium at Stanford University, 28-30 March: "Measurement of Electrical Conductivity in the Wake Neck."

Abstract: The wake of a reentry vehicle yields considerable information about the vehicle to an observing radar. In order to understand the radar cross section a direct measurement of electrical conductivity in the wake neck is required. Theoretical predictions of conditions in the wake neck hinge on knowledge of base flow which is one of the unsolved problems in fluid mechanics.

Professor Boyd F. Huff of the Government and Humanities Department presented a lecture to the Watsonville American Association of University Women's Great Decisions Study Group on 30 March. His topic was "NATO in Crisis."

Professor Donald E. Kirk of the Department of Electrical Engineering has been selected by the National Science Foundation to attend a two-week course in Modern Control Theory at the University of Southern California from June 5 - 16, 1967. The director of this program is Professor Richard E. Bellman of USC. Professor Kirk has also been awarded a fellowship by the National Aeronautics and Space Administration to participate in the Engineering Systems Design Program at Stanford University from June 19 to August 25, 1967. The principal objective of the program is to allow the participating Fellows to develop concepts which will enable them to organize multidisciplinary engineering systems design courses at their home institutions.

Commander Donald M. Layton, USN, Assistant Professor, Department of Aeronautics, has been reappointed for a third year to the American Institute of Aeronautics and Astronautics Technical Committee for Reliability and Maintainability. The official scope of this committee is to "develop and promote the design, analysis and management techniques to achieve product and system effectiveness including the effects of reliability, maintainability, safety, human factors, and other related disciplines."

Assistant Professor William Reese of the Department of Physics presented a seminar titled "Low Temperature Thermal Properties of Polymers" to the Physics Department of Michigan State University, East Lansing, on 31 March.

Dean R. F. Rinehart has accepted an invitation to serve on the newly-established Advisory Board for the Center for Naval Analyses of The Franklin Institute. The Center for Naval Analyses is engaged in performing advanced studies for the Secretary and the Chief of Naval Operations in top-level decision-making in the areas of naval operations, weapons systems, and the analyses of future force requirements. The function of the Advisory Board will be to review periodically the program of the Center and report to the Board of Managers and to the Navy on its status.

On 7 April Dean Rinehart participated in the initial meeting of the National Academy of Engineering's Advisory Panel to the Technical Analysis Division of the Bureau of Standards. The meeting was held at the National Bureau of Standards at Gaithersburg, Maryland.

Associate Professor James E. Sinclair, Department of Material Science and Chemistry, presented the following invited paper at the meeting of the Committee for Military Pyrotechnics, Tripartite Technical Cooperation Program, held at NOTS, China Lake, on 12 April: "Criteria for the Evaluation of Pyrotechnic Igniters."

Abstract: A description and review of the methods for evaluating the performance of igniters of a pyrotechnic nature. These techniques are discussed and criticized. The work done at NPGS was also included in the paper.

FACULTY PUBLICATIONS

Green, Theodore and Street, R. L.

Two supercavitating hydrofoils near a free surface. Journal of Fluid Mechanics, Vol. 27, part 1, p. 1-28. January 1967.

Abstract: A two-dimensional boundary-value problem is solved with the aid of a Hilbert transform.

Reinhardt, Richard A., Brenner, Norma L., and Sparkes, Robert K.

Equilibria among the chloroammine complexes of palladium (II). Inorganic Chemistry, Vol. 6, no. 2, p. 254-257. February 1967.

Abstract: Potentiometric and spectrophotometric studies have been made of the equilibria among several chloroammine complexes of Pd(II) in ammonium salt solutions at 25 and 30°. For unit ionic strength at 25°, equilibrium constants found potentiometrically for the substitution of one NH_3 by Cl^- are: in $Pd(NH_3)_4^{2+}$, 6.1×10^{-5}; $Pd(NH_3)_3Cl^+$, 1.6×10^{-4}; $Pd(NH_3)_2Cl_2$, 1.9×10^{-3}. Aquation constants are, similarly: $Pd(NH_3)_3Cl^+$, 0.0010; $Pd(NH_3)_2Cl_2$, 0.0047. ΔH° for the substitution by Cl^- of each of the first two NH_3 molecules in $Pd(NH_3)_4^{2+}$ is estimated as 10 kcal.

The most recent issue of Soviet Mathematics contains translations by Dr. R. F. Rinehart of two papers:

"A relaxation method of finding a common point of convex sets and its application to problems of optimization" by L. M. Bregman, and "Saddle points of uniformly approximate functionals" by S. V. Smirnov & M. K. Popatov, both from the Doklady Akademii Nauk SSSR.

CALENDAR OF FACULTY PROFESSIONAL TRIPS

. Teti	4/6 - 4/11	San Francisco Philadelphia	Annual meeting of American Academy of Political and Social Science.
. Shudde	4/9 - 4/12	Washington	Discuss research with Special Projects Office
. Kelly	4/9 - 4/15	Washington Columbus	Attend annual meeting of Optical Society of America. Visit NBS Gaithersburg
? R. E. Warner . Wible	4/10 - 4/11	Lemoore, Calif	Aviation Safety Survey
Sinclair	4/10 - 4/15	China Lake	Tripartite Technical Co-operation Program meeting, NOTS.
Clark	4/11	Livermore	Accompany students on visit to Livermore Lab.
Haltiner . Thompson	4/12	Tiburon, Calif.	Visit Bureau of Mines, examine oceanographic research vessel.
. Gawain	4/13-4/14	San Francisco	NRDL, research on computer simulation of fluid f
. Crittenden	4/13-4/19	Edgewood Arsenal	Attend mtg of Research Advis Council, U. S. Army Nuclear Defense Laboratory.
. Coppens	4/16 - 4/21	New York	Attend Acoustical Society mtg
. Newton	4/19-4/20	Davis, Calif.	Attend Region IX ASME Dept. Heads Committee mtg.
Chan	4/19-4/22	Silver Springs, Md.	Confer at NOL.
. Fremgen	4/22	San Francisco	Pacific Coast Section, American Accounting Assn.
. Oleson	4/23 - 4/29	Washington	Attend mtg of American Physi Society, visit NOL & NRL.
Reichenbach	4/23 - 4/25	La Jolla	Attend Spring Mtg of the West States Section, the Combustio Institute

. Hering	4/23 - 4/25	Saçramento	Aerojet. Witness operations and discuss research in mate and solid and liquid propellan
. Taylor	4/23 - 4/30	Washington	Attend NAVAIR's Meteorologi Oceanographic Equipment mtg
. Erickson	4/26 - 4/30	Chicago	Attend Conf. of Organization American Historians
L. W. ison	4/28 - 4/30	Palo Alto	Attend mtg of California Institute of International Affai